

# **INDIAN SPRINGS WATER COMPANY, INC WATER CONSERVATION PLAN**

## **October 2008**

**PREPARED FOR:**

Indian Springs Water Company, Inc  
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## INTRODUCTION (NRS 540.121)

This water conservation plan has been prepared for the Indian Springs Water Company, Inc. (ISWC). The purpose of the water conservation plan is to continue to encourage a more efficient use of water within the ISWC service area and comply with Nevada Revised Statutes (NRS) 540.121 through 540.151 (code is listed throughout this plan in bold/italics). ISWC supplies water for municipal and domestic purposes and by state law (as indicated below) is required to submit a water conservation plan for its service area.

***NRS 540.121 "Supplier of water" defined.***

***As used in NRS 540.121 to 540.151, inclusive, "supplier of water" includes, but is not limited to:***

- 1. Any county, city, town, local improvement district, general improvement district and water conservancy district;***
- 2. Any water district, water system, water project or water planning and advisory board created by a special act of the Legislature; and***
- 3. Any other public or private entity,***

***that supplies water for municipal, industrial or domestic purposes. The term does not include a public utility required to adopt a plan of water conservation pursuant to NRS 704.662. (Added to NRS by 1991, 520)***

ISWC is a privately owned, public utility that provides water to its customers on a "business" basis and as such is under the direct jurisdiction of the Public Utility Commission of Nevada (PUCN). Chapters 703 and 704 in the NRS define and regulate the duties and jurisdiction of the PUCN. A portion of NRS 704.001 is shown below illustrating the general purpose and policy as enacted by the Legislature.

***NRS 704.001 Purpose and policy of Legislature in enacting chapter. It is hereby declared to be the purpose and policy of the Legislature in enacting this chapter. .***

- 1. To confer upon the Commission the power, and to make it the duty of the Commission, to regulate public utilities to the extent of its jurisdiction;***
- 2. To provide for fair and impartial regulation of public utilities;***
- 3. To provide for the safe, economic, efficient, prudent and reliable operation and service of public utilities;***
- 4. To balance the interests of customers and shareholders of public utilities by providing public utilities with the opportunity to earn a fair return on their investments while providing customers with just and reasonable rates; and...***

Before ISWC can implement any rules, regulations, or fees they will have to be approved by the PUCN (which can be a lengthy process involving several hearings). Management at ISWC has indicated support for the water conservation measures and incentives included within this plan; however, the PUCN will have final review/decisions as to whether or not the goals, measures, and incentives will be allowed to be implemented by ISWC. This water conservation plan will need to be approved by the PUCN (as indicated in NRS 704.662, as shown below) before ISWC can put it into effect.

***NRS 704.662 Plan of water conservation: Requirement and procedure for adoption; review by Commission; election to comply with plan adopted by Commission***

- 4. The plan must be approved by the Commission before it is put into effect.***

The small (predominately residential) community of Indian Springs is located within Clark County, just north of Las Vegas, Nevada. ISWC supplies residents of this community with their water needs. ISWC currently has a total of 221 connections (194 residential, 9 commercial, 5 industrial, and 13 government accounts) serving approximately 1,337 persons. Water is supplied via two drilled underground wells that can each pump 500 gallons per minute, one 500,000 gallon capacity storage tank, and distribution system made up mostly of 6-inch pipelines and a small amount of 4-inch pipelines. Wastewater collected from the area is currently managed through a separate entity (Clark County Water Reclamation District (CCWRD)) and ISWC does not have any control or surface water rights related to the effluent within its service area. At the request of the Nevada Division of Environmental Protection, CCWRD assumed operational responsibility for Indian Spring's wastewater system in 2005. CCWRD is responsible for wastewater treatment and reclamation in all of the unincorporated areas of Clark County, including the outlying communities of Blue Diamond, Indian Springs, Laughlin, Searchlight, and Overton. CCWRD's three treatment facilities reclaim approximately 96 million gallons of wastewater every day.

Although population growth, in the near future, is not anticipated to unduly burden the water capabilities of the ISWC water system, it will result in an increased water demand over time. There have been only 4 new connections in the last two years added to the ISWC water system. As the demand for water increases, new facilities will need to be constructed/maintained and new sources of water will need to be developed. Financial savings is possible through water conservation if upgrades or new infrastructure can be deferred.

The primary water conservation goals for ISWC are listed below. Some of these goals involve ongoing efforts and others are one-time projects that will improve the abilities of ISWC to manage available water and reduce the amount of water waste.

- ISWC will increase public awareness of the limited supply of water in Nevada and the need to conserve water.
- ISWC will create a "Water Conservation Tips" newsletter that will be distributed in the monthly bill of its customers on a semi-annual basis. In addition, ISWC is in the process of creating a website for its company. ISWC will include water conservation information and links to water conservation sites on this website.
- ISWC will purchase and supply its users with toilet "dye tablets" and instructional information on how to use them in order to educate its users of the benefits of retrofitting inefficient toilets and amounts of water that can be saved by doing so.
- ISWC will encourage the reduction in lawn sizes and the use of native plants/drought tolerant plants. To prevent water waste from irrigation overspray, ISWC will educate users in practical locations and sizes for turf in order to avoid areas that are difficult to water (narrow, strip, or odd shaped turf.)
- ISWC will strive to reduce water waste and reduce consumption by 5% by the year 2013 (savings of 5,500,000 gallons per year.)
- ISWC will maintain accurate water pumping and usage records in order to identify and reduce water leakages and inaccuracies in the water system (distribution lines, water meters, etc.)
- ISWC will draft and include within its Tariffs the following:
  1. "Irrigation Schedule" with provisions that would restrict landscape watering during the hottest times of the day and include a watering schedule (days of the week allowed to water).
  2. Definitions of "wasting water".

3. "Schedule of Penalties/Fines" for the violation of the rules and regulations and for the wasting of water.

These will have to be approved by the PUCN before they can be implemented.

- ISWC will periodically review and evaluate water conservation measures and incentives for effectiveness and determine if revisions or continuations to the programs will be made.
- ISWC will provide training and education to management and existing key personnel in water conservation measures, management practices, and techniques.
- ISWC's existing rate structure consists of a "two-tiered" increasing block structure, which promotes conservation by not only charging customers based on actual water usage, but also increases this amount when the water usage increases. ISWC is currently in the process of implementing an increasing "three-tiered" block rate water structure which, in itself, will help to conserve water by charging customers more when the water usage increases. A "three-tiered" structure will provide financial incentive for implementing conservation measures to the heaviest water users within the ISWC service area.
- ISWC will update the water conservation plan every five years (as required by NAS 540.131.4.c.)

This plan includes information to help water customers in the ISWC service area continue to conserve water. The plan can be used as a resource to implement and measure the effectiveness of conservation efforts and can provide a planning guide for future conservation. The following is included in this water conservation plan prepared for ISWC:

- Conservation Goals
- Existing and Planned Conservation Measures and Incentives
- Educational Materials/Examples

This plan is compliant with Nevada Revised Statutes (NRS) sections 540.121 through 540.151 and is available for public inspection at the following location:

**Indian Springs Water Company, Inc**  
101 W. Gretta Lane  
P.O. Box 585  
Indian Springs, Nevada 89018  
(702) 879-3728

Public comments about this plan are encouraged. Written comments may be sent to the address above.

ISWC supplies water for municipal purposes and is required to submit a water conservation plan to the State of Nevada for approval. ISWC's current water conservation plan was submitted to the State of Nevada in 1992 and this is an update to that plan (as required every five years.) Following is the code from the water conservation portion of the Nevada Revised Statutes and it's applicability to ISWC.

***NRS 540.131 Plan of water conservation: Procedure for adoption and updating of plan; review of plan by Section; joint plans permitted by certain suppliers; duties of local governing body.***

***1. Except as otherwise provided in subsection 5, each supplier of water which supplies water for municipal, industrial or domestic purposes shall, on or before July 1, 1992, adopt a plan of water conservation based on the climate and the living conditions of its service area in accordance with the provisions of NRS 540.141, and shall update the plan pursuant to paragraph (c) of subsection 4. The provisions of the plan must apply only to the supplier's property and its customers. The supplier of water shall submit the plan to the Section for review by the Section pursuant to subsection 3.***

***2. As part of the procedure of adopting a plan, the supplier of water shall provide an opportunity for any interested person, including, but not limited to, any private or public entity that supplies water for municipal, industrial or domestic purposes, to submit written views and recommendations on the plan.***

ISWC will provide an opportunity for any interested party to submit written views and recommendations on the plan. ISWC will allow anyone interested in the water conservation plan to provide written comment on the water conservation plan. ISWC will review all of the public comments and make any revisions it deems necessary.

***3. The plan must be reviewed by the Section within 30 days after its submission and approved for compliance with this section and NRS 540.141 before it is adopted by the supplier of water.***

***4. The plan:***

***(a) Must be available for inspection by members of the public during office hours at the offices of the supplier of water;***

ISWC will keep this water conservation plan in its office during regular business hours for public viewing. Members of the public are encouraged to make written views and recommendations on the water conservation plan. These written views should be sent to the ISWC office.

***(b) May be revised from time to time to reflect the changing needs and conditions of the service area. Each such revision must be made available for inspection by members of the public; and***

ISWC will revise this water conservation plan (as needed) to keep up with any changing needs and conditions of its service area. If any revisions are made to this water conservation plan, such revisions will have to be approved by the PUCN and made available for inspection by members of the public in the ISWC office during regular business hours.

**(c) Must be updated every 5 years and comply with the requirements of this section and NRS 540.141.**

ISWC will update this water conservation plan at least every 5 years (in order to comply with State requirements). The next update to the plan will need to be approved by the State and completed in 2013.

**5. Suppliers of water:**

**(a) Who are required to adopt a plan of water conservation pursuant to this section; and**

**(b) Whose service areas are located in a common geographical area may adopt joint plans of water conservation based on the climate and living conditions of that common geographical area. Such a plan must comply with the requirements of this section and NRS 540.141.**

This water conservation plan is intended solely for use within the ISWC service area boundaries and does not include a joint effort with any additional water suppliers.

**6. The board of county commissioners of a county, the governing body of a city and the town board or board of county commissioners having jurisdiction of the affairs of a town shall:**

**(a) Adopt any ordinances necessary to carry out a plan of conservation adopted pursuant to this section which applies to property within its jurisdiction;**

ISWC will adopt Tariffs necessary to carry out the water conservation plan. The Tariffs will need to be approved by the PUCN.

**(b) Establish a schedule of fines for the violation of any ordinances adopted pursuant to this subsection; and**

ISWC will include in its Tariffs a section on penalties/fines for water wasting violations. The Schedule of Fines will be agreed upon between ISWC and the PUCN. Including these fines will allow ISWC to enforce the Tariffs and will encourage its users against wasting water.

**(c) Hire such employees as it deems necessary to enforce the provisions of any ordinances it adopts pursuant to this subsection. (Added to NRS by 1991, 520; A 2005, 2570; 2007, 1253).**

Due to the small size of the system, ISWC does not currently have personnel, procedures, or finances in place to monitor water waste full time; however, existing employees and individual members within the community report visible water wasting to the manager. ISWC does not have the financial capability of hiring employees for the sole purpose of water conservation; however, there is value in training existing personnel in conservation management practices and techniques so that waste can be prevented and conservation related rules/regulations can be enforced. Without this training the conservation and drought sections in this plan will be ineffective. ISWC will train existing personnel in water conservation management practices and techniques.

## CONSERVATION PROVISIONS/MEASURES (NRS 540.141)

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ISWC will continue to implement public education programs to increase awareness of the limited supply of water in the State of Nevada and the need to conserve water (as required by NRS 540.141.) Following is the code from the water conservation portion of the Nevada Revised Statutes and its applicability to ISWC.

**NRS 540.141 Required provisions of plan or joint plan of water conservation; review by Section; posting of plans and joint plans on Internet website.**

**1. A plan or joint plan of water conservation submitted to the Section for review must include provisions relating to:**

**(a) Methods of public education to:**

**(1) Increase public awareness of the limited supply of water in this State and the need to conserve water.**

A key objective of this plan is to increase public awareness of the limited supply of water in Nevada and the need to conserve water. A successful educational program provides information to the public that helps to motivate water users in their efforts to conserve water. The ISWC will provide its customers with educational materials and resources including home & landscape guides that can be viewed (upon request) and links to conservation websites. Example water conservation brochures and pamphlets are included in **Appendix A**. Regardless of the type of educational resources that are used, the most important consideration is their content and if the information is disseminated successfully. Specific water conservation incentives are included in the NRS 540.151 section of this plan.

**(2) Encourage reduction in the size of lawns and encourage the use of plants that are adapted to arid and semiarid climates.**

Water usage is much higher in the summer than the winter due to the watering needs of landscaping. For this reason, a landscaping code is a fundamental part of an effective water conservation plan. ISWC does not have the authority to institute a landscaping code; however, ISWC will encourage the reduction of the size of lawns and encourage the use of Xeriscaping™ methods and drought tolerant/native plants by providing education and conservation tips to its users. **Appendix B** gives a list of compatible shrubs, trees, and plants for the ISWC service area. Education will encourage ISWC customers to become more conscious about the types of plants that can be purchased that require the least amount of water and the locations where the plants are most suited for planting.

**(b) Specific conservation measures required to meet the needs of the service area, including, but not limited to, any conservation measures required by law.**

Water conservation measures are defined as a device/behavioral practice that is implemented by a water system/user that will result in a quantifiable/measurable amount of water savings or a more efficient use of water. Water conservation measures include “hardware” devices/equipment or behavioral/management practices that will directly save water. Examples of water conservation measures are listed below and are included in **Appendix C**:

- Residential (Indoor)  
Hardware devices/equipment- installing low flow toilets, waterless and composting toilets and urinals, low-flow shower heads and faucets, water-efficient clothes washers and dishwashers, etc.

- Behavioral/management practices- not using toilets for trash disposal, shutting off faucets when brushing teeth or performing other duties, washing only full loads of clothes, dishes, etc.
- Landscaping
    - Hardware devices/equipment- installing native/drought tolerant plants/landscaping (including Xeriscape™ techniques), drip irrigation, automatic shut-off hoses, rain sensors, etc.
    - Behavioral/management practices- watering less frequently, utilizing water efficient landscape maintenance practices, etc.
  - Commercial/Industrial/Institutional
    - Hardware devices/equipment- using cooling towers with recycled water, reusing process water, leak repair within facility, etc.
    - Behavioral/management practices- shutting off unused valves, sweeping a sidewalk rather than washing with a hose, use water-efficient equipment, not serving water automatically in restaurants, etc.
  - Water utilities
    - Hardware devices/equipment- leak detection and repair, hydrant capping, utilizing reused effluent, implementing water rate structures that promotes conservation, etc.
    - Behavioral/management practices- regularly service and adjust system valves and connections, reduce high pressure locations, etc.

Water conservation measures that are applicable to ISWC are listed as follows:

#### ISWC Residential Hardware/Device Conservation Measures

ISWC is a small water system that has limited regulatory authority and finances. Conservation measures involving retrofitting equipment/devices are expensive; therefore, a cost-benefit analysis would need to be performed before implementation of any such program to evaluate its effectiveness.

Most indoor water can be saved in the bathroom. Toilets, showerheads, and faucets are typically the biggest culprits of indoor water waste. ISWC will purchase dye tablets so that its users can determine if they have a leaky toilet. ISWC will include instructions on how to use the dye tablets and information on how much water/money can be saved if this is fixed. Typically retrofit of a leaking toilet can save between 0.5 to 1.5 gpf, depending on the type of device installed and the adaptability of a particular toilet to operate at reduced flows. In a household the water savings range from 2 to 4 gpcpd. ISWC can expect to save between 0 to 1,950,000 gallons per year if all of the toilets within its district were operating efficiently. ISWC will encourage the use of toilet retrofit devices within its system through education.

#### ISWC Residential Behavioral Conservation Measures

ISWC will use informational measures to educate its users of individual behavioral changes that can be made to save water. ISWC will produce a semi-annual "Water Conservation Tips" newsletter that will be included in the user's monthly bill. This newsletter will include conservation tips and the amount of water that can be saved by implementing behavioral conservation measures such as turning off the water when brushing your teeth, using other methods besides allowing the water to run to cool/heat the water that comes out of the faucet, taking shorter showers, only washing clothes/dishes when the machine is full, proper landscape management, etc. ISWC is in the process of creating a website for its company and will include water conservation tips and links to conservation sites within this website. A successful educational program on behavioral changes can result in long term water savings and a financial savings to the water user.

ISWC Commercial/Industrial Hardware & Behavioral Conservation Measures

There are only 9 commercial connections on the ISWC water system. Water conservation to these establishments can come from a variety of different methods. ISWC will provide educational materials to these establishments on the importance of fixing leaking toilets/sinks, proper landscape maintenance, etc. Education can result in both hardware and behavioral changes that will directly save water.

ISWC Water Utility Hardware & Behavioral Conservation Measures

ISWC can save water through the process of detecting and repairing leaks within its system. Detecting leaks within the system can be a time-consuming and costly process that may or may not result in the actual savings of a significant amount of water. Leaks within the system can contribute to high percentages of unaccounted-for water within the system. Based on historical records for pumping and water usage, the amount of unaccounted-for water for ISWC is indicated in Table 1 below.

Year	Total Production (gallons)	Total Billed Water (gallons)	Total Approximate Unmetered Water* (gallons)	Unaccounted-For Water (gallons)	Unaccounted-For Water (%)
2007	113,000,000	102,700,000	2,200,000	8,100,000	7.2

Note: \*Fire hydrant flushing approximated at 180,000 gallons per month

Currently, ISWC does not have a distribution leak detection program. Leaks in the system are detected through meter readings, monthly audits, and customer reports. As indicated in Table 2, ISWC has an unaccounted-for water loss of less than 10%. Causes for water being unaccounted-for are numerous. Leaking mains, dead meters, under-registering meters, record keeping practices, un-metered uses, and multiple users on meters all contribute to the problem. All water systems lose some amount of water and, on average; an efficient system would have 10% or less of unaccounted-for water. Calculations for ISWC indicate that its system is efficient with respect to established thresholds for unaccounted-for water percentages; however, a recent inspection indicated that the automatic well system is not efficient and sometimes does not shut off the well causing the storage tank to overflow. If the unaccounted-for water percentage increases significantly, ISWC will consider the feasibility of installing a telemetry system to prevent these overflows.

Due to the low percentage of water lost within the ISWC system, a leak detection program is not expected to save much additional water; however, there is value in maintaining accurate pumping and usage records in order to estimate unaccounted-for water within the system. ISWC will continue to detect leaks by comparing pumping and usage records, evaluating meter readings, performing monthly customer audits, and through customer calls/reports in order to evaluate how much water is unaccounted-for annually. If the unaccounted-for water percentage increases significantly, ISWC will consider the feasibility of implementing a leak detection program.

***(c) The management of water to:***

***(1) Identify and reduce leakage in water supplies, inaccuracies in water meters and high pressure in water supplies; and***

ISWC will strive to reduce the amount of water extracted from the various sources versus the water actually delivered (billed) to customers through a system of identifying and reducing leaks in the water distribution system, instituting a meter maintenance/replacement program, connecting un-metered and multiple users, monitoring water usages that are not billed for, and servicing the system valves and connections.

An audit comparing water production with metered amounts will be performed prior to implementing incentives or measures. Additional audits will then be done every year thereafter. Results from the initial audit will be compared with those of subsequent audits in order to determine the effectiveness of measures and/or incentives. ISWC will continue to detect leaks by comparing pumping and usage records, evaluating meter readings, performing monthly customer audits, and through customer calls/reports in order to evaluate how much water is unaccounted-for annually. If the unaccounted-for water percentage increases significantly, ISWC will consider the feasibility of implementing a leak detection program.

***(2) Where applicable, increase the reuse of effluent.***

Wastewater collected from the area is currently managed through a separate entity (Clark County Water Reclamation District (CCWRD)) and ISWC does not have any control or surface water rights related to the effluent within its service area. At the request of the Nevada Division of Environmental Protection, CCWRD assumed operational responsibility for the wastewater system in 2005. CCWRD is responsible for wastewater treatment and reclamation in all of the unincorporated areas of Clark County, including the outlying communities of Blue Diamond, Indian Springs, Laughlin, Searchlight, and Overton. CCWRD's three treatment facilities reclaim approximately 96 million gallons of wastewater every day.

***(d) A contingency plan for drought conditions that ensures a supply of potable water.***

The primary goal of water conservation is to insure that there is sufficient water for essential public health and safety needs at all times. The climate in Northern Nevada is arid and subject to periodic droughts that can vary in duration. It is important, therefore, to have a reserve on hand for such events. Conserving water during times of plenty will help to insure that such reserves are available for drought and emergency conditions. With recent water shortages becoming evident in other locations around the United States, maintaining an adequate supply of water is becoming a more vital component of providing the water that a community needs.

ISWC will maintain an adequate supply of potable water. This includes the implementation of a detailed staged contingency plan for drought conditions. Indian Springs is located in unincorporated Clark County and is subject to Title 30 of the Unified Development Code. Section 30.64.070 outlines drought measures that can be applied during a drought or water shortage. A copy of Section 30.64.070 is attached in **Appendix D**.

All water supplied by ISWC comes from groundwater sources. Because of this it is difficult to determine the effect of a drought year on the groundwater system and the consequences of a drought may not be detected in the water table until several years after the drought. For this reason it is important that ISWC monitor precipitation, surface water levels, water table levels,

and pumping records over the long term. A review of water supplies will be done to determine the availability of water for the current year and the following year. In extreme instances, where a well can no longer provide the needed water, ISWC will consider options such as restricting water usage until the problem can be solved, increasing the depth of the existing wells, developing a new well site, and/or aggressively finding a new water source, etc. For instance, if groundwater drops to a certain level, a corresponding stage of drought measures are then required. ISWC will determine how groundwater levels relate to the different stages of drought.

***(e) A schedule for carrying out the plan or joint plan.***

The conservation measures and incentives in this plan will be implemented according to the schedule shown in Table 2 below.

<b>TABLE 2 INDIAN SPRINGS WATER COMPANY, INC ISWC CONSERVATION PLAN IMPLEMENTATION SCHEDULE</b>			
	<b>2008</b>	<b>2009</b>	<b>2010</b>
<b><i>Measures</i></b>			
Toilet Dye Tablets/Education	Evaluate	Draft	Implement
Leak Detection Program	Monitor/Evaluate	Monitor/Evaluate	Monitor/Evaluate
Restructure and Increase the Existing Water Rates	Draft	PUCN Approval/ Implement	Ongoing
<b><i>Incentives</i></b>			
Annual Production Audit	Ongoing	Ongoing	Ongoing
Monthly Consumption Audits	Ongoing	Ongoing	Ongoing
Revision to Rules & Regulations (Rules & Regulations Landscaping Schedule, Fines/Penalties, etc.)	Draft	PUCN Approval/ Implement	Ongoing
Website Links to Water Conservation	Draft	Implement	Ongoing
Semi-Annual "Water Conservation Tip" Inserts	Draft	Implement	Ongoing
Conservation Training for Key Personnel	Initiate	Implement	Ongoing

***(f) Measures to evaluate the effectiveness of the plan or joint plan.***

The annual production versus water usage audit will help determine if the schedule needs to be adjusted to accommodate the implementation of new measures or incentives or the discontinuation of old ones. Based on the historical pumping records and a population estimate of 1,337 persons, ISWC uses approximately 236 gallons per capita per day (gpcpd). There has been no recorded impact from prior conservation efforts. Implementation of the plan and several years of data collection to evaluate its effectiveness will be required; however ISWC is currently slightly above the State of Nevada's average of 200 gpcpd by 36 gpcpd. ISWC uses approximately 17,500,000 gallons of water more than the State's average; however, this State average includes the average of Northern and Southern Nevada. Temperatures in Southern Nevada, where ISWC is located, is hotter and extends for a longer season than those in Northern Nevada. Southern Nevada's hotter temperatures reflect a higher gpcpd than the State average as are indicated in ISWC having a 236 gpcpd. ISWC's goal in the next 5 years is to

reduce the average water usage in its service area by 5% (5,500,000 gallons of water annually) bringing the system to an average of 225 gpcpd. In addition to education on water conservation, a proposed rate increase is anticipated to conserve a considerable amount of water and will help ISWC achieve this goal.

**(g) For each conservation measure specified in the plan or joint plan, an estimate of the amount of water that will be conserved each year as a result of the adoption of the plan or joint plan, stated in terms of gallons of water per person per day.**

For each conservation measure and incentive, the amount of water savings that is estimated to be conserved each year as a result of adoption of the plan is shown in Table 3. The conservation incentives for ISWC are described in the NRS 540.151 section of this plan. Table 3 includes a water savings for the conservation incentives based on the combination of incentives indicated in this plan.

<b>TABLE 3 INDIAN SPRINGS WATER COMPANY, INC ESTIMATED ANNUAL WATER SAVINGS FROM CONSERVATION MEASURES</b>	
	<b>Annual Water Savings (gallons) [gpcpd]</b>
<b>Conservation Measures</b>	
Toilet Dye Tablet and Education	(0-1,950,000) [0-4.0]
Leak Detections (Unaccounted-For Water)	(0 - 8,100,000) [0-16.6]
Restructure and Increase Existing Water Rates	(0-9,000,000) [0-18.5]
<b>Conservation Incentives</b>	
Combined Conservation Incentive Efforts (Including education through quarterly mailers and website links)	(0 - 3,600,000) [0-7.4]
<b>Total Potential Future Water Savings</b>	
	(0 – 22,650,000) [0-46.4]
<b>Annual Conservation Goal (5% consumption reduction)</b>	<b>(5,500,000) [11.3]</b>

It is difficult to determine the actual amount of water savings that can be achieved through conservation incentives so a range is indicated based on the amount of participation within the community. ISWC water usage of 236 gpcpd is slightly higher than the State of Nevada's average. Conservation through measures and incentives (obtained through an increase in the customers becoming further educated and continually reminded on the value of conserving water) will assist ISWC in achieving its goal of a 5% annual water reduction.

The potential water savings based on different customer participation levels (assuming a population of 1,337 within the ISWC service area) are shown in Table 4. A range is provided for a savings of 16 gpcpd (reduction to 220 gpcpd) because it is difficult to determine the additional level of individual participation in educational conservation programs.

<b>TABLE 4</b> <b>INDIAN SPRINGS WATER COMPANY, INC</b> <b>RANGE OF WATER SAVINGS FROM RESIDENTIAL CONSERVATION</b>		
<b>% of Users Consuming 220 gallons/day</b>	<b>New gpcpd Average</b>	<b>Amount Conserved Annually (million gallons)</b>
<b>0</b>	<b>236</b>	<b>0</b>
<b>25</b>	<b>232</b>	<b>1.9</b>
<b>50</b>	<b>228</b>	<b>3.9</b>
<b>75</b>	<b>224</b>	<b>5.8</b>
<b>100</b>	<b>220</b>	<b>7.8</b>
<b>ISWC WATER CONSERVATION GOAL (5% REDUCTION)</b>		
<b>236 gpcpd</b>	<b>225 gpcpd</b>	<b>5.5</b>

2. *A plan or joint plan submitted for review must be accompanied by an analysis of:*  
 (a) *The feasibility of charging variable rates for the use of water to encourage the conservation of water.*

ISWC currently meters all of its users and charges its users based on a “two-tiered” increasing block rate structure. The current water rate schedule includes a monthly base rate (depending on the meter size) and an additional charge per 1,000 gallons of water usage is indicated in Table 5 below. ISWC and the PUCN are in the process of finalizing a new rate schedule and structure that has been presented to the PUCN for final approval by January 2009.

<b>TABLE 5</b> <b>INDIAN SPRINGS WATER COMPANY, INC</b> <b>EXISTING RATE SCHEDULE</b>	
<b>Meter Size</b>	<b>Monthly Base Rate</b>
<b>5/8" - 3/4"</b>	<b>\$ 14.75</b>
<b>1"</b>	<b>\$ 19.00</b>
<b>1.5"</b>	<b>\$ 42.75</b>
<b>2"</b>	<b>\$ 76.00</b>
<b>3"</b>	<b>\$248.00</b>
<b>Note: No water is included in the base rate and a commodity charge of the following (per 1,000 gallons of usage) is charged in addition to the monthly base rate:</b>  Tier 1: \$0.69 (0 – 20,000 gallons of water usage) Tier 2: \$1.09 (20,001 + gallons of water usage)	

***(b) How the rates that are proposed to be charged for the use of water in the plan or joint plan will maximize water conservation, including, without limitation, an estimate of the manner in which the rates will affect consumption of water.***

Water rates, as a conservation incentive, work to increase awareness about the financial value of reducing water use and can motivate users to implement water conservation measures. The two-tiered rate structure (currently utilized by ISWC) helps to encourage its users to become more conscious of water use by increasing the cost to use higher volumes of water. The existing ISWC water rates have been designed to charge users for the amount of water they actually use and to encourage conservation; however, including only two tiers in the existing ISWC rate structure does not fully optimize water conservation for the highest residential users. Since the existing second tier goes from 20,000+ gallons of water usage, conserving water above the 20,000 gallon threshold is recognized; however, those residential users utilizing 50,000-125,000 gallons of water a month have less financial incentive to conserve water above the 20,000 gallon threshold than if there were more tiers included in the rate structure.

The new structure is anticipated to include “three-tiers” and will give a much greater financial incentive to those residential water users that are using the highest amounts of water because water will increase more significantly per 1,000 gallons in this higher tier. Based on residential water usage within ISWC, the average monthly winter and summer usages are 7,000 and 21,000 gallons, respectively. In order to maximize the residential water conservation that can be achieved through water rates, the new “three-tiered” water rate structure should consider these average amounts for the “thresholds” of the proposed new water rates. The proposed first tier threshold of 7,000 gallons is reflective of the average winter usage and can be utilized for the first tier threshold. The existing proposed second tier threshold of 63,000 gallons of water usage is almost triple the average summer usage, and does not fully promote water conservation for the users that are above the average summer water usage of 21,000 gallons per month. The existing proposed rate structure of “three tiers” are anticipated to conserve more water for the highest residential, commercial, government users (those utilizing over the 63,000 gallons per month); however, the customers using between 21,000 to 63,000 gallons of water a month will have less of a financial incentive to conserve water. The new water rate for the third tier is anticipated to be 1.5-2.5 times the existing second tier water rate will double the monthly bill. This increase to the bill is anticipated to increase awareness of the amount of water that is being used and provide a greater financial incentive for residential users (that consume the highest amounts of water) to conserve. The restructured and increased water rates are anticipated to reduce monthly residential water usage by 10% below the Tier 3 threshold and up to 25% above the Tier 3 threshold and are anticipated to save between 0-9,000,000 gallons annually (18.5 gpcpd).

***3. The Section shall review any plan or joint plan submitted to it within 30 days after its submission and approve the plan if it is based on the climate and living conditions of the service area and complies with the requirements of this section.***

***4. The Chief may exempt wholesale water purveyors from the provisions of this section which do not reasonably apply to wholesale supply.***

***5. To the extent practicable, the State Engineer shall provide on his Internet website a link to the plans and joint plans that are submitted for review. In carrying out the provisions of this subsection, the State Engineer is not responsible for ensuring, and is not liable for failing to ensure, that the plans and joint plans which are provided on his Internet website are accurate and current. (Added to NRS by 1991, 521; A 2005, 2571; 2007, 1254)***

## CONSERVATION INCENTIVES (NRS 540.151)

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Water conservation incentives are defined as methods that motivate water users to implement conservation/efficiency measures. In itself, conservation incentives do not directly save a single drop of water; they increase the customer awareness about the value of reducing water. Increasing public awareness about the value of reducing water will lead to users making behavioral changes that will result in the increase implementation of conservation measures that directly save a quantifiable amount of water. Conservation incentives are classified into three categories: educational, financial, and regulatory. Examples of water conservation incentives are listed below:

- Educational  
Direct-mail literature, water bill inserts, adding historical water consumption on users bills, television and radio advertisements, media coverage, school curriculum, local workshops/training programs/"Water Fairs", etc.
- Financial  
Bill credits, rebates, conservation designed water rate structures, incentives or surcharge fees, developer rebates/compensations for water savings achieved, etc.
- Regulatory  
Water efficiency policies/ordinances/laws/plumbing codes, landscape design standards, irrigation scheduling (allowable days of week/times of day to irrigate), penalties for outdoor water waste, pollution prevention requirements, etc.

***NRS 540.151 Supplier of water required to adopt plan to provide certain incentives; procedure for adoption of plan; adoption of joint plans permitted.***

***1. Except as otherwise provided in subsection 5, each supplier of water which supplies water for municipal, industrial or domestic purposes shall adopt a plan to provide incentives:***

***(a) To encourage water conservation in its service area;***

Following are specific conservation incentive methods that are used or will be utilized by ISWC to increase public awareness on water conservation within its service area:

- ISWC will draft and implement a plan to mail water conservation flyers (on a semi-annual basis) with the monthly bill to inform ISWC users of the importance to conserve water. These mailings should be timed with water conservation issues for the upcoming months. For instance, landscaping conservation tips should go out in the May/June months and continue throughout the summer; whereas, indoor conservation tips should go out during the months of September/October, and extreme cold weather conservation tips (contact information for frozen pipes, etc.) should go out during December/January. Included in **Appendix E** are websites that ISWC can utilize to obtain valuable information on water conservation tips to pass on to its users.
- ISWC is currently in the process of creating a website for its company. When this website is completed it will contain water conservation information and links to conservation websites. **Appendix E** shows websites that ISWC can provide links to from its website so that its users can obtain valuable information on water conservation.

- Detecting leaks, on the customer’s side of the property, can help users to identify and fix water waste related to unnecessary leaks on their individual properties. Included in **Appendix F** is a description and examples on how to read a water meter and can be included in the monthly bill to inform users on how to detect a leak on their side.

***(b) To retrofit existing structures with plumbing fixtures designed to conserve the use of water; and***

ISWC will provide educational materials that will inform its users on the importance of water savings through the retrofitting of old plumbing fixtures. The most recent Federal and California plumbing standards are shown in Table 6. It is valuable to include California’s standards for reference since in most cases California’s requirements are more stringent. The comparison infers that there are plumbing fixtures available that exceed federal efficiency requirements and offer consumers alternatives that further improve conservation efforts. **Appendix G** lists EPA water usage benchmarks for typical residential uses. Leaking toilets are one of the biggest culprits of indoor water waste that can be relatively easy and inexpensive to fix on the users side. ISWC will purchase and distribute toilet “dye tablets” with informational instructions and amounts of water that can be saved through the user retrofitting any toilets that are leaking.

<b>TABLE 6 Federal and California Plumbing Standards</b>				
Device	FEDERAL ENERGY POLICY ACT (FEPA)		CALIFORNIA	
	Manufacture	Effective Date	Sale and Installation	Effective Date
Shower Heads	2.5 gpm*	1/1/94	2.5 gpm	3/20/92
Lavatory Faucets	2.5 gpm	1/1/94	2.2 gpm	3/20/92
Sink Faucets	2.5 gpm	1/1/94	2.2 gpm	3/20/92
Metering Faucets	*	1/1/94	†	7/1/92
Tub Spout Diverters	Not included in FEPA		0.1 to 0.3‡	3/20/92
Residential Toilets	1.6 gpf	1/1/94	1.6gpf	3/20/92
Flushometer Valves	1.6 gpf§	1/1/97	1.6 gpf	1/1/92
Commercial Toilets	1.6 gpf	1/1/97	1.6 gpf	1/1/94
Urinals	1.0 gpf	1/1/94	1.0 gpf	1/1/92

\* Gallons per minute.

\*\* 0.25 gal/cycle (pertains to maximum water delivery per cycle).

† Hot water maximum flow rate range from 0.25 to 0.75 gal/cycle and/or from 0.5 gpm to 2.5 gpm, depending on controls and hot water system.

‡ 0.1 (new), to 0.3 gpm (after 15,000 cycles of diverting).

§ Gallons per flush.

***(c) For the installation of landscaping that uses a minimal amount of water.***

ISWC will encourage the reduction of lawn sizes within its service area through education, incentives, a watering schedule of even/odd addresses, and instituting times during the day when watering is not allowed. Regulatory conservation incentives that ISWC will draft and implement include tariffs on outdoor water irrigation scheduling, water wasting, and a schedule of penalties/fines that will be implemented to enforce the violation of any water wasting within its service area.

ISWC will provide definitions of “water waste” in its Tariffs and provide warnings/penalties/fines for such defined “water waste.” ISWC will include brochures on Xeriscaping™ methods, types of plants that grow well in the area, and the difficulty in watering small strips/odd shaped turf, etc. to encourage its users to become more conscious about the types of plants to purchase and locations to place them.

The ISWC is responsible creating Tariffs within its service area; however, the PUCN must approve these Tariffs before ISWC can implement them. The intent of water rules and regulations is to restrict use if it is found that water is being wasted or to limit water use during water shortages and drought conditions. ISWC will draft and approve a Tariff that will define “water shortage” and “waste of water” and include sections on enforcement through the use of warnings, citations, fines, and discontinuation of service.

***The supplier of water may request assistance from the Section to develop its plan.***

***2. As part of the procedure of adopting a plan, the supplier of water shall provide an opportunity for any interested person to submit written views and recommendations on the plan.***

***3. The supplier of water shall file a copy of the plan with the Section for informational purposes.***

***4. The plan:***

***(a) Must be available for inspection by members of the public during office hours at the offices of the supplier of water; and***

***(b) May be revised from time to time to reflect the changing needs and conditions of the service area. Each such revision must be made available for inspection by members of the public.***

***5. Suppliers of water:***

***(a) Who are required to adopt a plan for incentives pursuant to this section; and***

***(b) Whose service areas are located in a common geographical area,***

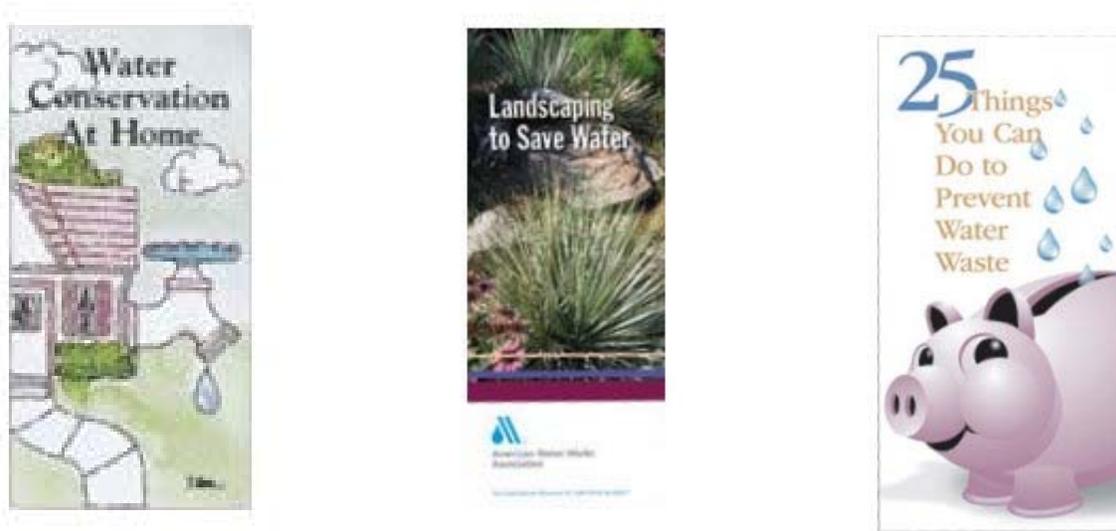
***may adopt joint plans.(Added to NRS by 1991, 522; A 2005, 2571)***

**APPENDIX A – AWWA CONSERVATION BROCHURES/PAMPHLETS EXAMPLES**

The following pamphlets are available on the AWWA website at: [www.awwa.org/bookstore](http://www.awwa.org/bookstore)

**Figures 1.1, 1.2, 1.3**

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**Water Conservation at Home** discusses in-home conservation practices for bathroom, kitchen and outdoor water use (see Figure 1.1).

**Landscaping to Save Water** explains the seven principles in the Xeriscape(tm) concept that promotes attractive landscapes, conserves water, and protects the environment (see Figure 1.2).

**25 Things You Can Do to Prevent Water Waste** has 25 easy things people can do to conserve water inside and outside their homes (see Figure 1.3).

**Figures 1.4, 1.5, 1.6**

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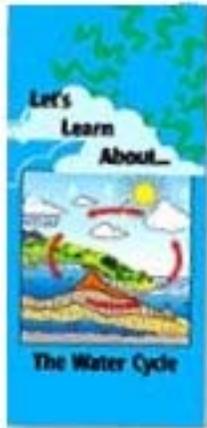
**5 Basic Ways to Conserve Water** provides 5 things people can do to cut water use by 25% (see Figure 1.4)

**It's a Natural** is an introduction to planning a water-conserving home landscape (see Figure 1.5)

**55 Facts, Figure and Follies of Water Conservation** is a list of 55 items that promote water conservation (see Figure 1.6).

**Figures 1.7, 1.8, 1.9**

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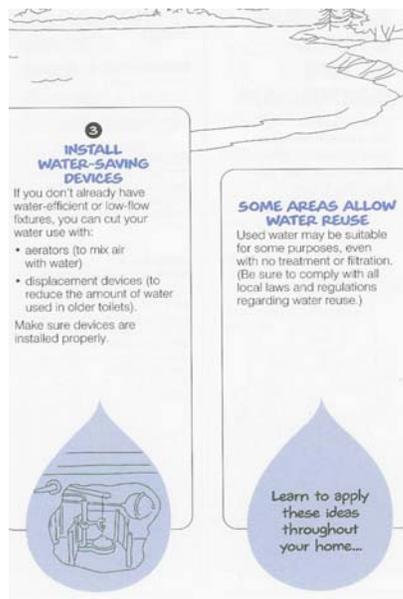
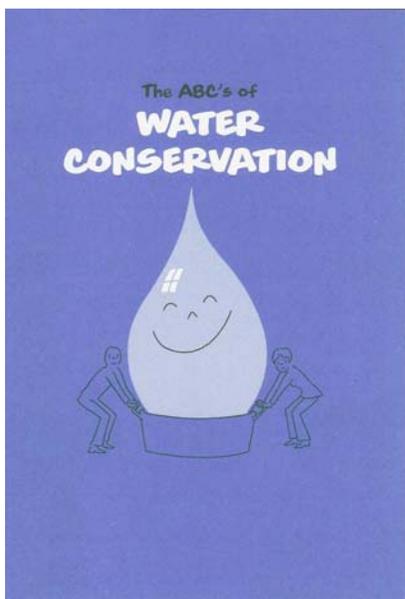


**Let's Learn About...The Water Cycle** diagrams the seven stages of the water cycle (see Figure 1.7)

**A Consumer's Guide to Water Conservation the Inside Story** gives eight ways to reduce water waste inside the home (see Figure 1.8).

**A Consumer's Guide to Water Conservation the Outside Story** gives eight ways to reduce water waste in landscaping (see Figure 1.9).

Pershing County Water Conservation Guide and Sample Page:



**APPENDIX B – LANDSCAPE GUIDES**

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The following list is taken from the Truckee Meadows Water Authority (TMWA) website. More information on these plants, including color photos can be found at [www.tmwandscapeguide.com](http://www.tmwandscapeguide.com).

## PERENNIAL FLOWERS

[Artemisia species](#)/Sage or Wormwood (Perennial)—water use: Very Low

[Eriogonum umbellatum](#)/Sulfur Flowered Buckwheat (Perennial)—water use: Very Low

[Achillea species](#)/Yarrow (Perennial)—water use: Low

[Agastache cana](#)/Bubblemint (Perennial)—water use: Low

[Aurinia saxatilis](#)/Basket-of-Gold (Perennial)—water use: Low

[Coreopsis species](#)/Tickseed (Perennial)—water use: Low

[Crocus species](#)/Spring Crocus (Perennial)—water use: Low

[Dianthus species](#)/Pinks (Perennial)—water use: Low

[Eschscholzia californica](#)/California poppy (Perennial)—water use: Low

[Gaillardia grandiflora](#)/Blanket Flower (Perennial)—water use: Low

[Iris germanica](#)/Iris germanica (Perennial)—water use: Low

[Linum species](#)/Flax (Perennial)—water use: Low

[Narcissus species](#)/Daffodil or Narcissus (Perennial)—water use: Low

[Nepeta racemosa](#)/Catmint (Perennial)—water use: Low

[Oenothera species](#)/Evening Primrose (Perennial)—water use: Low

[Perovskia atriplicifolia](#)/Russian Sage (Perennial)—water use: Low

[Sedum species](#)/Stonecrop (Perennial)—water use: Low

[Senecio Cineraria](#)/Dusty Miller (Perennial)—water use: Low

[Stachys byzantina](#)/Lamb's Ears (Perennial)—water use: Low

[Thermopsis montana](#)/No Lupine (Perennial)—water use: Low

[Tulbaghia violacea](#)/Society Garlic (Perennial)—water use: Low

[Alcea rosea](#)/Hollyhock (Perennial)—water use: Moderate

[Antirrhinum majus](#)/Snapdragon (Perennial)—water use: Moderate

[Armeria maritima](#)/Sea Pinks (Perennial)—water use: Moderate

[Aster species](#)/Aster (Perennial)—water use: Moderate

[Echinacea purpurea](#)/Coneflower (Perennial)—water use: Moderate

[Gaura lindheimeri](#)/Gaura (Perennial)—water use: Moderate

[Geranium species](#)/Handy Geranium (Perennial)—water use: Moderate

[Gypsophila species](#)/Baby's Breath (Perennial)—water use: Moderate

[Hemerocallis hybrids](#)/Daylily (Perennial)—water use: Moderate

[Heuchera sanguinea](#)/Coral Bells (Perennial)—water use: Moderate

[Iberis sempervirens](#)/Candytuft (Perennial)—water use: Moderate

[Kniphofia uvaria](#)/Red Hot Poker (Perennial)—water use: Moderate

[Lavandula angustifolia](#)/Lavender (Perennial)—water use: Moderate

[Lilium species](#)/Lily (Perennial)—water use: Moderate

[N/A](#)/Pussy toes (Perennial)—water use: moderate

[Papaver species](#)/Poppy (Perennial)—water use: Moderate

[Penstemon species](#)/Beard Tongue (Perennial)—water use: Moderate

[Platycodon grandiflorus](#)/Balloon Flower (Perennial)—water use: Moderate

[Rudbeckia fulgida](#)/Black-Eyed Susan (Perennial)—water use: Moderate

[Salvia Species](#)/Sage or Salvia (Perennial)—water use: Moderate

[Saponaria species](#)/Soapwort (Perennial)—water use: Moderate

[Tanacetum species](#)/Painted or Michaelmas Daisy (Perennial)—water use: Moderate

[Tulipa species](#)/Tulip (Perennial)—water use: Moderate

[Veronica spicata](#)/Spike Speedwell (Perennial)—water use: Moderate

[Viola species](#)/Violet or Pansy (Perennial)—water use: Moderate

## **GROUNDCOVERS, VINES, AND GRASSES**

[Opuntia polyacantha](#)/Prickly Pear Cactus (Groundcovers)—water use: Very Low

[Clematis species](#)/Clematis (Groundcovers)—water use: Low

[Euphorbia species](#)/Spurge (Groundcovers)—water use: Low

[Helictorichon sempervirens](#)/Blue Oat Grass (Groundcovers)—water use: Low

[Hypericum calycinum](#)/Jacob's Ladder or Aaron's Beard (Groundcovers)—water use: Low

[Juniperus horizontalis](#)/Groundcover Junipers (Groundcovers)—water use: Low

[Lathyrus latifolius](#)/Perennial Sweet Pea (Groundcovers)—water use: Low

[Lonicera species](#)/Honeysuckle (Groundcovers)—water use: Low

[Panicum virgatum](#)/Switch Grass (Groundcovers)—water use: Low

[Polygonum species](#)/Polygonum (Groundcovers)—water use: Low

[Santolina species](#)/Lavender Cotton (Groundcovers)—water use: Low

[Vinca minor](#)/Dwarf Periwinkle (Groundcovers)—water use: Low

[Wisteria sinensis](#)/Chinese Wisteria (Groundcovers)—water use: Low

[Zauschneria californica](#)/California Fuschia (Groundcovers)—water use: Low

[Calmagrostis x acutiflora](#)/Feather Reed Grass (Groundcovers)—water use: Moderate

[Campsis radicans](#)/Red Trumpet Creeper (Groundcovers)—water use: Moderate

[Cerastium tomentosum](#)/Snow in Summer (Groundcovers)—water use: Moderate

[Delosperma cooperi](#)/Hardy Purple Ice Plant (Groundcovers)—water use: Moderate

[Hedera helix](#)/Ivy (Groundcovers)—water use: Moderate

[Helianthemum nummularium](#)/Sunrose (Groundcovers)—water use: Moderate

[Mahonia repens](#)/Creeping Mahonia (Groundcovers)—water use: Moderate

[N/A](#)/Northern seacats (Groundcovers)—water use: moderate

[Phlox subulata](#)/Moss Pink (Groundcovers)—water use: Moderate

[Potentilla neumanniana](#)/Cinquefoil (Groundcovers)—water use: Moderate

[Sedum species](#)/Stonecrop (Groundcovers)—water use: Moderate

[Thymus species](#)/Thyme (Groundcovers)—water use: Moderate

## SHRUBS

[Artemisia tridentata var. tridentata](#)/Big Sagebrush (Shrubs)—water use: Very Low

[Atriplex canescens](#)/Four Wing Saltbrush (Shrubs)—water use: Very Low

[Chrysothamnus nauseosus](#)/Rubber Rabbitbrush (Shrubs)—water use: Very Low

[Amelanchier species](#)/Serviceberry or Juneberry (Shrubs)—water use: Low

[Aronia species](#)/Chokeberry (Shrubs)—water use: Low

[Berberis species](#)/Barberry (Shrubs)—water use: Low

[Caragana species](#)/Peashrub (Shrubs)—water use: Low

[Caryopteris x clandonensis](#)/Blue Mist Spiraea (Shrubs)—water use: Low

[Chaenomeles speciosa](#)/Flowering Quince (Shrubs)—water use: Low

[Cytisus species](#)/Broom (Shrubs)—water use: Low

[Elaeagnus commutata](#)/Silverberry (Shrubs)—water use: Low

[Euonymus species](#)/Euonymus (Shrubs)—water use: Low

[Forestiera neomexicana](#)/New Mexico Privet (Shrubs)—water use: Low

[Genista species](#)/Dwarf Broom (Shrubs)—water use: Low

[Hibiscus syriacus](#)/Rose of Sharon (Shrubs)—water use: Low

[Ligustrum species](#)/Privet (Shrubs)—water use: Low

[Lonicera tatarica](#)/Tatarian Honeysuckle (Shrubs)—water use: Low

[Mahonia aquifolium](#)/Oregon Grape (Shrubs)—water use: Low

[Pinus mugo](#)/Mugo Pine (Shrubs)—water use: Low

[Prunus species](#)/Bush Cherry (Shrubs)—water use: Low

[Pyracantha coccinea](#)/Firethorn or Pyracantha (Shrubs)—water use: Low

[Rhus species](#)/Sumac (Shrubs)—water use: Low

[Ribes aureum](#)/Golden Currant (Shrubs)—water use: Low

[Shepherdia argentea](#)/Silver Buffaloberry (Shrubs)—water use: Low

[Symphoricarpos albus](#)/Snowberry (Shrubs)—water use: Low

[Syringa vulgaris](#)/Common Lilac (Shrubs)—water use: Low

[Yucca species](#)/Yucca (Shrubs)—water use: Low

[Acer circinatum](#)/Vine Maple (Shrubs)—water use: moderate

[Amorpha canescens](#)/Leadplant (Shrubs)—water use: moderate

[Buddleia species](#)/Butterfly Bush (Shrubs)—water use: Moderate

[Catalpa x Chilopsis](#)/Chitalpa (Shrubs)—water use: moderate

[Ceratoides lanata](#)/Winterfat (Shrubs)—water use: moderate

[Cercocarpus ledifolius](#)/Mt. Mahogany (Shrubs)—water use: moderate

[Chamaebatiaria millifolium](#)/Fernbush (Shrubs)—water use: moderate

[Chilopsis linearis](#)/Desert or Flowering Willow (Shrubs)—water use: moderate

[Cotoneaster species](#)/Cotoneaster (Shrubs)—water use: Moderate

[Cowania mexicana](#)/Cliffrose (Shrubs)—water use: moderate

[Fallugia paradoxa](#)/Apache Plume (Shrubs)—water use: moderate

[Forsythia species](#)/Forsythia (Shrubs)—water use: Moderate

[Hamamelis x intermedia](#)/Witch Hazel (Shrubs)—water use: Moderate

[Hesperaloe parviflora](#)/Red Yucca (Shrubs)—water use: moderate

[Juniperus chinensis](#)/Sea Green Juniper (Shrubs)—water use: Moderate

[Kerria japonica](#)/Kerria (Shrubs)—water use: Moderate

[Kolkwitzia amabilis](#)/Beautybush (Shrubs)—water use: moderate

[Philadelphus virginalis](#)/Mock Orange (Shrubs)—water use: Moderate

[Picea glauca var. albertiana 'Conica'](#)/Dwarf Alberta Spruce (Shrubs)—water use: Moderate

[Pinus contorta 'Latifolia'](#)/Lodgepole Pine (Shrubs)—water use: moderate

[Potentilla fruticosa](#)/Shrubby Potentilla (Shrubs)—water use: Moderate

[Purshia tridentata](#)/Bitterbrush (Shrubs)—water use: moderate

[R. frangula 'Asplenifolia'](#)/Fernleafed buckthorn (Shrubs)—water use: Moderate

[R. frangula 'Columnaris'](#)/Tall Hedge Buckthorn (Shrubs)—water use: Moderate

[Rhamnus frangulia](#)/Sea buckthorn (Shrubs)—water use: Moderate

[Rosa species](#)/Hardy Shrub Roses (Shrubs)—water use: Moderate

[Spiraea species](#)/Spiraea (Shrubs)—water use: Moderate

[Symphoricarpa x chenaultii](#)/Coralberry 'Hancock' (Shrubs)—water use: Moderate

[Thuja occidentalis](#)/American Arborvitae (Shrubs)—water use: Moderate

[Viburnum species](#)/Viburnum (Shrubs)—water use: Moderate

## TREES

[Acer ginnala](#)/Amur Maple (Trees)—water use: Deep Water 10-14 days

[Ailanthus altissima](#)/Tree of Heaven (Trees)—water use: Deep Water 10-14 days

[Calocedrus decurrens](#)/Incense Cedar (Trees)—water use: Deep Water 10-14 days

[Catalpa species](#)/Catalpa (Trees)—water use: Deep Water 10-14 days

[Cedrus atlantica glauca](#)/Blue Atlas Cedar (Trees)—water use: Deep Water 10-14 days

[Celtis occidentalis](#)/Hackberry (Trees)—water use: Deep Water 10-14 days

[Crataegus species](#)/Hawthorn (Trees)—water use: Deep Water 10-14 days

[Elaeagnus angustifolia](#)/Russian Olive (Trees)—water use: Deep Water 10-14 days

[Gleditsia triacanthos inermis](#)/Honeylocust (Trees)—water use: Deep Water 10-14 days

[Juniperus species](#)/Tree Juniper (Trees)—water use: Deep Water 10-14 days

[Maackia amurensis](#)/Maackia (Trees)—water use: Deep Water 10-14 days

[Maclura pomifera](#)/Osage Orange (Trees)—water use: Deep Water 10-14 days

[Malus hybrids](#)/Crabapple (Trees)—water use: Deep Water 10-14 days

[Pinus species](#)/Pine (Trees)—water use: Deep Water 10-14 days

[Platanus acerifolia](#)/Sycamore (Trees)—water use: Deep Water 10-14 days

[Quercus species](#)/Oak (Trees)—water use: Deep Water 10-14 days

[Robinia species](#)/Locust (Trees)—water use: Deep Water 10-14 days

[Sequoiadendron giganteum](#)/Giant Redwood (Trees)—water use: Deep Water 10-14 days

[Ulmus parvifolia](#)/Chinese elm (Trees)—water use: Deep Water 10-14 days

[Zelkova serrata](#)/Zelkova (Trees)—water use: Deep Water 10-14 days

[Aesculus hippocastanum](#)/Common Horsechestnut (Trees)—water use: Deep Water 7-10 days

[Carpinus betulus](#)/Hornbeam (Trees)—water use: Deep Water 7-10 days

[Cotinus coggygria](#)/Smoke Tree (Trees)—water use: Deep Water 7-10 days

[Cupressus glabra](#)/Arizona Cypress (Trees)—water use: Deep Water 7-10 days

[Fraxinus species](#)/Ash (Trees)—water use: Deep Water 7-10 days

[Ginkgo biloba](#)/Maidenhair Tree (Trees)—water use: Deep Water 7-10 days

[Koelreuteria paniculata](#)/Golden Rain Tree (Trees)—water use: Deep Water 7-10 days

[Laburnum watereri](#)/Golden Chain Tree (Trees)—water use: Deep Water 7-10 days

[Liquidambar styraciflua](#)/Sweetgum (Trees)—water use: Deep Water 7-10 days

[Liriodendron tulipifera](#)/Tulip Tree (Trees)—water use: Deep Water 7-10 days

[Malus domestica](#)/Fruiting Apple Tree (Trees)—water use: Deep Water 7-10 days

[Morus alba](#)/Mulberry (Trees)—water use: Deep Water 7-10 days

[Phellodendron amurense](#)/Amur Cork Tree (Trees)—water use: Deep Water 7-10 days

[Picea species](#)/Spruce (Trees)—water use: Deep Water 7-10 days

[Pistacia chinensis](#)/Chinese Pistache (Trees)—water use: Deep Water 7-10 days

[Prunus species](#)/Plum or Cherry (Trees)—water use: Deep Water 7-10 days

[Pyrus Species](#)/Pear (Trees)—water use: Deep Water 7-10 days

[Sophora japonica](#)/Japanese Pagoda Tree (Trees)—water use: Deep Water 7-10 days

[Sorbus species](#)/Mountain Ash (Trees)—water use: Deep Water 7-10 days

[Thuja occidentalis](#)/Arborvitae (Trees)—water use: Deep Water 7-10 days

[Tilia species](#)/Linden (Trees)—water use: Deep Water 7-10 days

[Gymnocladus dioica](#)/Kentucky Coffee Tree (Trees)—water use: Moderate

[Juniperus monosperma](#)/Singleseed Juniper (Trees)—water use: moderate

[Pinus edulis](#)/Pinon Pine (Trees)—water use: moderate

## **APPENDIX C – EXAMPLES OF WATER CONSERVATION MEASURES**

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Conservation measures are divided into two types: (1) Hardware/Equipment and (2) Behavioral/Managerial. Each of these is subdivided into five categories of application: (1) Residential, (2) Landscape, (3) Industrial, Commercial, and Institutional (ICI) (4) Agricultural, and (5) Purveyor. The following conservation measures will be classified first by application and then by type. These measures are suggestions and can only be enforced if included as part of an ordinance.

## A.1 RESIDENTIAL CONSERVATION MEASURES

### A.1.1 Behavioral Measures

A.1.1.1 Residential Water Audits. Water audits could target high use customers first and then be offered to all customers. The following elements should be part of an effective audit.

- Purpose for the audit.
- Estimation of use for all fixtures and appliances.
- Check for and repair leaks.
- Evaluation of Landscape (See "Landscape Conservation Measures)
- Evaluation of outdoor water use.
- Evaluate efficiency measures.
- Educate customers using available flyers

An audit should take no more than 30 to 45 minutes.

A.1.1.2 Additional Measures. The sample pamphlets in Appendix A include additional behavioral conservation measures.

### A.1.2 Hardware/Equipment Measures

The following is a list of devices/practices that will reduce water consumption in the home.

Measure	Description
<b><i>Bathroom/Kitchen Fixtures</i></b>	
Low-flow toilets	1.6 gallons per flush
Toilet retrofit devices	Bladders (bags), dams, early close flappers, other hardware and adjustments
Toilet leak repairs	Includes detection (dye tabs) and replacement of worn parts.
Low-volume shower heads	2.5 gallons per minute @ 80 psi
Showerhead retrofit devices	Includes temporary cutoff valves and restrictors.
Low-volume faucets	2.5 gallons per minute @ 80 psi
Faucet retrofit devices	Includes aerators, activation sensors, self closing and metered valves
Faucet maintenance	Includes washer replacement, repacking, tightening, and cleaning aerators
Water pressure reduction	Only needed if house pressure exceeds what's required
<b><i>High Efficiency Appliances</i></b>	
Clothes washers	27 gallons per load
Dish washers	4.5 gallons per load

## A.2 LANDSCAPE CONSERVATION MEASURES

### A.2.1 Behavioral Measures

A.2.1.1 Landscape Water Audits. Landscape water audits should be conducted on park and golf course irrigation systems and could be considered an option on residential irrigation systems, targeting high-volume users.

- Purpose for the audit.
- Estimation of outdoor use based on meter records.
- Check for and repair leaks.
- Evaluation of Landscape (size, soil, amount of turf, types of plants)
- Evaluation of irrigation system (Timers, Use of drip, Precipitation amounts).
- Efficiency recommendations.
- Educate customers using available flyers

A residential landscape audit should take no more than an hour. Parks and golf courses could take substantially longer.

A.2.1.2 Xeriscape™. Xeriscape is a method of landscaping that employs low-water use plants, turf, ground covers, shrubs and trees. It includes careful planning, soil analysis, and irrigation system design.

A.1.1.3 Additional Measures. The sample pamphlets in Section 5.1 include additional behavioral conservation measures.

### A.2.2 Hardware/Equipment Measures

Landscape hardware measures consist of two basic groups: (1) Landscape materials and (2) irrigation equipment.

Measure	Description
<b><i>Landscape Materials</i></b>	
Trees, plants, and grass	Should be well suited to climate and altitude and be drought tolerant
Organic mulch	Grass clippings, leaves, wood chips, bark, and pine needles. Organic mulches help to retain soil moisture and keep ground cool around plants.
Inorganic mulch	Boulders, gravel, pavers, decomposed granite, and stepping stones. Inorganic mulches are generally more for decorative purposes but they reduce the amount of trees, plants, and turf thereby conserving water.
Compost	Made of manure or biosolids and wood, straw, grass, and leaves. Helps plants stay healthy and retains moisture in the soil.
<b><i>Irrigation Equipment</i></b>	
Valves	Should be sized to meet requirements and checked periodically for leaks
Sprinkler Heads	Should match water volume requirements of area being irrigated.
Sprinkler Nozzles	Should have proper arc of coverage and proper trajectory.
Irrigation Controllers	Should have required number of stations, programs, and starts. Also rain delays and sensor terminals.
Drip irrigation	Insures water is directed to where it's needed.

### A.3 INDUSTRIAL, COMMERCIAL, AND INSTITUTIONAL (ICI) CONSERVATION MEASURES

#### A.3.1 Behavioral and Hardware/Equipment Measures

A.3.1.1 ICI Water Audits. Since ICI water audits can require a substantial amount of time (4 hours or more), it may be necessary to have a private engineering firm hired by the water user conduct the audit. There is incentive for ICI customers to pay for audits since the results of an audit could translate into substantial savings. An ICI water audit should include the following elements:

- Support from ICI owners, managers, and employees
- Survey/Estimation of facility use based on meter records.
- Calculation of water-related costs.
- Evaluation of efficiency measures.
- Evaluation of payback periods for measures.
- Efficiency recommendations and implementation.
- Tracking and reporting system.

A.3.1.2 Manual Washing. Manual washing is cleaning done on surfaces with hoses and cloths.

#### MANUAL WASHING

Behavioral Measures	Hardware/Equipment Measures
<ul style="list-style-type: none"> <li>• Surfaces should be swept or brushed off before using water to clean.</li> </ul>	<ul style="list-style-type: none"> <li>• High pressure low-volume hoses with automatic shut-off nozzles</li> <li>• High-pressure pumps, steam cleaners.</li> </ul>

A.3.1.3 Vehicle Washing. Vehicle washing includes manual washing and automated car washes or a combination of both.

#### VEHICLE WASHING

Behavioral Measures	Hardware/Equipment Measures
<ul style="list-style-type: none"> <li>• Limit number of spray nozzles and set flow rates at lowest volume and pressure required.</li> <li>• Adjust nozzles in automated systems so that they take full advantage of gravity and position. Also make sure water shuts off after vehicles have passed.</li> <li>• Increase conveyor speeds or reduce rinse cycle time.</li> <li>• Sweep wash area before using water to clean.</li> <li>• Establish a regular maintenance schedule that includes checking for leaks and making repairs.</li> </ul>	<ul style="list-style-type: none"> <li>• Recycling systems. These would include filters and storage tanks.</li> <li>• High pressure pumping systems.</li> </ul>

A.3.1.4 Kitchens and Restaurants. Kitchen and restaurant conservation is divided into four areas of application; 1. Food and drink preparation, 2. Dishwashing, 3. Garbage disposal and scraping trough, and 4. Ice making.

**FOOD AND DRINK PREPARATION**

Behavioral Measures	Hardware/Equipment Measures
<ul style="list-style-type: none"> <li>• Presoak and wash food service articles in basins instead of running water.</li> <li>• Reduce thawing of food with hot water unless required by law. If required use lower flow.</li> <li>• Avoid running water to melt ice in sinks.</li> <li>• Use full loads in dishwashers and other automated equipment.</li> <li>• Serve water only when requested by customers.</li> </ul>	<ul style="list-style-type: none"> <li>• Low-volume faucets</li> <li>• Hands-free foot pedal valves for faucets</li> <li>• On demand hot water dispensers</li> </ul>

**DISHWASHING**

Behavioral Measures	Hardware/Equipment Measures
<ul style="list-style-type: none"> <li>• Presoak utensils, dishes, and pots and pans in basins of water instead of using running water prior to loading dishwashing machines.</li> <li>• Scrape food off of plates rather than use running water.</li> <li>• Operate scraping troughs only while dishes are actually being washed.</li> <li>• Assess the water efficiency of the current dishwashing system to determine where improvements might be made.</li> <li>• Always wash full loads in automated machines.</li> <li>• Operate conveyor type dishwashers only when dishes are actually passing through the machine.</li> <li>• Verify that the dishwashing equipment is using the minimum amount of flow recommended by the manufacturer.</li> <li>• Since many older automated dishwashing systems are neither energy nor water efficient, evaluate the cost of retrofitting or replacing existing equipment.</li> <li>• Turn dishwashers off when not in use.</li> <li>• Routinely check all dishwashing equipment to ensure there are no leaks.</li> <li>• Post signs requesting that personnel minimize their use of utensils, dishes, and pots and pans to save water.</li> </ul>	<ul style="list-style-type: none"> <li>• Manual pre-wash sprayers with “dead man” shut off controls.</li> <li>• Low-flow spray heads on all sprayers.</li> <li>• New water efficient dishwashing equipment.</li> <li>• Electronic eye sensors that shut off conveyer type systems when dishes are not passing through the machine.</li> </ul>

### GARBAGE DISPOSER AND SCRAPING TROUGH

Behavioral Measures	Hardware/Equipment Measures
<ul style="list-style-type: none"> <li>• Eliminate disposers and troughs.</li> <li>• Use the minimum acceptable flow rate on all machines.</li> <li>• Reuse wastewater in the mixing chamber of the disposer.</li> </ul>	<ul style="list-style-type: none"> <li>• Garbage strainers (instead of disposers)</li> <li>• Sensors that detect the amount of flow in a disposer and regulate flow accordingly.</li> <li>• Solenoid valves that turn water off when the disposer is off.</li> <li>• Flow regulators for disposer supply lines.</li> </ul>

### ICE MAKERS

Behavioral Measures	Hardware/Equipment Measures
<ul style="list-style-type: none"> <li>• Use the minimum flow rate recommended by the manufacturer on water cooled icemakers.</li> <li>• Adjust machines to produce ice only when it's needed.</li> </ul> <p>Collect spent cooling water and reuse it for non-potable purposes.</p>	<ul style="list-style-type: none"> <li>• Air-cooled icemakers.</li> <li>• Re-circulating systems for water-cooled icemakers.</li> <li>• Ice flake machines that use less bleed off than cube machines.</li> </ul>

A.3.1.5 Laundries and Laundromats. This section includes measures that are applicable in hotels, motels, hospitals, nursing homes, diaper services, restaurants, and coin operated Laundromats.

### LAUNDRIES AND LAUNDROMATS

Behavioral Measures	Hardware/Equipment Measures
<ul style="list-style-type: none"> <li>• Operate equipment with full loads only.</li> <li>• Reduce water levels for partial loads.</li> <li>• Back flush filters or softeners only when necessary.</li> </ul>	<ul style="list-style-type: none"> <li>• Computer controlled rinse water reclamation systems.</li> <li>• Wash and rinse water treatment and reclamation systems.</li> <li>• Continuous batch washers.</li> <li>• Ozone laundry systems.</li> <li>• Horizontal axis washers.</li> </ul>

A.3.1.6 Swimming Pools. The measures in this section can be applied to commercial and residential swimming pools.

### SWIMMING POOLS

Behavioral Measures	Hardware/Equipment Measures
<ul style="list-style-type: none"> <li>• Limit the frequency of pool refilling.</li> <li>• Cover the pool with an insulated cover when not in use to reduce losses due to heat and evaporation.</li> <li>• Reduce the level of the pool to avoid losses due to splashing.</li> <li>• Lower the pool temperature.</li> <li>• Back wash filters only when necessary. If timed, verify that frequency is efficient.</li> <li>• Regularly check pool for leaks and cracks. Keep pool and filter clean to avoid unnecessary backwashing.</li> </ul>	<p>There are no special equipment measures that would help conserve water in pools. It is important however that available equipment is efficient and used properly.</p>

A.3.1.7 Cooling Systems. This section includes measures for three types of cooling systems: 1. Single-pass, 2. Evaporative, and 3. Equipment. Single-pass cooling uses fresh water to cool without re-circulating any of the water used in the first pass. Evaporative coolers are used for cooling in commercial and residential applications and are commonly known as swamp coolers. Equipment cooling includes both single-pass and re-circulating systems that are used to cool equipment and machinery.

**SINGLE-PASS COOLING**

Behavioral Measures	Hardware/Equipment Measures
<ul style="list-style-type: none"> <li>• Reuse water for landscaping, vehicle washing, or another cooling application that allows for water to be at a higher temperature.</li> <li>• Eliminate single-pass systems.</li> </ul>	<ul style="list-style-type: none"> <li>• Air-cooled equipment (i.e. compressors, pumps, icemakers, etc...)</li> <li>• Automatic controls that insure coolers only operate when needed.</li> </ul>

**EVAPORATIVE COOLING**

Behavioral Measures	Hardware/Equipment Measures
<ul style="list-style-type: none"> <li>• Regularly check for leaks in hoses and pan.</li> <li>• Replace pads at least annually.</li> <li>• Shut cooler off when building is unoccupied.</li> <li>• Annually service the equipment by oiling moving parts and cleaning off accumulated scale or corrosion.</li> </ul>	<p>There are currently no equipment measures for evaporative coolers. The design of the coolers is relatively simple.</p>

**EQUIPMENT COOLING**

Behavioral Measures	Hardware/Equipment Measures
<ul style="list-style-type: none"> <li>• Reuse water in single pass systems for other cooling purposes. Examples of reuse include cooling molten materials, landscape, of boiler make-up water.</li> <li>• Replace al single pass cooling systems with closed-loop systems or replace water-cooled equipment with air-cooled.</li> </ul>	

A.3.1.8 Heating Systems. This section deals with conservation measures for boilers and steam generators which are used to heat large buildings and multiple-building facilities.

**HEATING SYSTEMS**

Behavioral Measures	Hardware/Equipment Measures
<ul style="list-style-type: none"> <li>• Regularly inspect systems for leaks and make repairs.</li> <li>• Insulate all piping.</li> <li>• Limit boiler bleed-off to a level that satisfies water quality requirements.</li> <li>• Discharge blow-down into an expansion tank instead of using cold water to cool it.</li> </ul>	<ul style="list-style-type: none"> <li>• Flow meters for make-up and blow-down valves.</li> <li>• Automatic controls to discharge blow-down.</li> </ul>

A.3.1.9 Leaks and Water Losses. This section covers water conservation measures relating to leaks and losses.

**LEAKS AND WATER LOSSES**

Behavioral Measures	Hardware/Equipment Measures
<ul style="list-style-type: none"> <li>• Regularly check for leaks at all water connections. Keep in mind that higher pressure applications have more incidence of leakage.</li> <li>• Regularly check all vessels that contain water for cracks or bad seals.</li> <li>• Regularly check all heating and cooling systems.</li> <li>• Repair any leaks that are discovered.</li> </ul>	<ul style="list-style-type: none"> <li>• Leak detection equipment. This could include sonic or probe type equipment.</li> <li>• Any equipment used to stop a leak. This would depend on the material of the pipe or vessel that has a leak.</li> </ul>

A.3.1.10 ICI Maintenance Practices. This section reemphasizes maintenance conservation measures for ICI facilities that have been mentioned in previous sections. These measures should become standard procedure at all ICI facilities.

- Create a maintenance schedule that includes schedules for leak detection inspections and meter reading, and repair procedures.
- Monitor water-use records keeping track of any increases or decreases in use.
- Conduct water audits every one to three years.
- Shut off supply lines to areas that are not being used.
- Install pressure reducers where feasible.
- Keep a maintenance schedule to clean cooling and heating equipment regularly.
- Recycle and reuse water when feasible.
- Insulate all hot water pipes.
- Replace old equipment with water saving equipment.
- Install timers wherever possible.
- Educate employees on water saving techniques.

## **A.4 GENERAL CONSERVATION MEASURES**

This list of conservation behaviors and is divided into four parts: Home, Landscaping, Community, and Miscellaneous.

### **HOME BEHAVIORS**

1. When washing dishes by hand, don't let the water run while rinsing. Fill one sink with wash water and the other with rinse water.
2. Evaporative coolers require a seasonal maintenance checkup. For more efficient cooling, check your evaporative cooler annually.
3. Run your washing machine and dishwasher only when they are full and you could save 1000 gallons a month.
4. Use the garbage disposal sparingly. Compost instead and save gallons every time.
5. Keep a pitcher of water in the refrigerator instead of running the tap for cold drinks, so that every drop goes down you not the drain.
6. Check your water meter and bill to track your water usage.
7. Wash your produce in the sink or a pan that is partially filled with water instead of running water from the tap.
8. Use a broom instead of a hose to clean your driveway or sidewalk and save 80 gallons of water every time.
9. If your shower can fill a one-gallon bucket in less than 20 seconds, then replace it with a water efficient showerhead.
10. Collect the water you use for rinsing produce and reuse it to water houseplants.
11. We're more likely to notice leaky faucets indoors, but don't forget to check outdoor faucets, pipes, and hoses for leaks.
12. When you shop for a new appliance, consider one offering cycle and load size adjustments. They are more water and energy-efficient than older appliances.
13. Time your shower to keep it under 5 minutes. You'll save up to 1000 gallons a month.
14. Install low-volume toilets.
15. When you clean your fish tank, use the water you've drained on your plants. The water is rich in nitrogen and phosphorus, providing you with a free and effective fertilizer.
16. Put food coloring in your toilet tank. If it seeps into the toilet bowl, you have a leak. It's easy to fix, and you can save more than 600 gallons a month.
17. Plug the bathtub before turning the water on, and then adjust the temperature as the tub fills up.
18. Designate one glass for your drinking water each day. This will cut down on the number of times you run your dishwasher.

19. Don't use running water to thaw food.
20. Grab a wrench and fix that leaky faucet. It's simple, inexpensive, and can save 140 gallons a week.
21. When doing laundry, match the water level to the size of the load.
22. Teach your children to turn the faucets off tightly after each use.
23. Before you lather up, install a low-flow showerhead. They're inexpensive, easy to install, and can save your family more than 500 gallons a week.
24. Soak your pots and pans instead of letting the water run while you scrape them clean.
25. Make sure you know where your master water shut-off valve is located. This could save gallons of water and damage to your home if a pipe were to burst.
26. Turn off the water while you brush your teeth and save 4 gallons a minute. That's 200 gallons a week for a family of four.
27. Make sure your toilet flapper doesn't stick open after flushing.
28. Make sure there are aerators on all of your faucets.
29. Install an instant water heater on your kitchen sink so you don't have to let the water run while it heats up. This will also reduce heating costs for your household.
30. Cut back on rinsing if your dishwasher is new. Newer models clean more thoroughly than older ones.
31. Bathe your young children together.
32. Winterize outdoor spigots when temps dip to 20 degrees F to prevent pipes from bursting or freezing.
33. Insulate hot water pipes so you don't have to run as much water to get hot water to the faucet.
34. Drop that tissue in the trash instead of flushing it and save gallons every time.
35. If your toilet was installed prior to 1980, place a toilet dam or bottle filled with water in your toilet tank to cut down on the amount of water used for each flush. Be sure these devices do not interfere with operating parts.
36. Install water softening systems only when necessary. Save water and salt by running the minimum number of regenerations necessary to maintain water softness.
37. Wash clothes only when you have a full load and save up to 600 gallons each month.
38. Listen for dripping faucets and toilets that flush themselves. Fixing a leak can save 500 gallons each month.
39. Cook food in as little water as possible. This will also retain more of the nutrients.
40. Turn the water off while you shampoo and condition your hair and you can save more than 50 gallons a week.
41. Choose new water-saving appliances, like washing machines that save up to 20 gallons per load.

42. Select the proper size pans for cooking. Large pans require more cooking water than may be necessary.
43. Turn off the water while you shave and you can save more than 100 gallons a week.
44. To save water and time, consider washing your face or brushing your teeth while in the shower.
45. For hanging baskets, planters and pots, place ice cubes under the moss or dirt to give your plants a cool drink of water and help eliminate water overflow.
46. Throw trimmings and peelings from fruits and vegetables into your yard compost to prevent from using the garbage disposal.
47. Keep a bucket in the shower to catch water as it warms up or runs. Use this water to flush toilets or water plants.
48. When you are washing your hands, don't let the water run while you lather.
49. Pre-treat stains before washing clothes to avoid re-washing.
50. Use the shortest wash cycle for lightly soil cloths.
51. Check washing machine hoses regularly for leaks.
52. Do not pre-rinse dishes except in cases of sticky or burn-on food.
53. Scrape off food with a utensil or used paper napkin when pre-cleaning for dishwasher.

## **LANDSCAPE BEHAVIORS**

1. Check your sprinkler system frequently and adjust sprinklers so only your lawn is watered and not the house, sidewalk, or street.
2. Avoid planting turf in areas that are hard to water such as steep inclines and isolated strips along sidewalks and driveways.
3. Plant during the spring or fall when the watering requirements are lower.
4. Minimize evaporation by watering during the early morning hours, when temperatures are cooler and winds are lighter.
5. Use a layer of organic mulch around plants to reduce evaporation and save hundreds of gallons of water a year.
6. Divide your watering cycle into shorter periods to reduce runoff and allow for better absorption every time you water.
7. Only water your lawn when needed. You can tell this by simply walking across your lawn. If you leave footprints, it's time to water.
8. Adjust your lawn mower to a higher setting. Longer grass shades root systems and holds soil moisture better than a closely clipped lawn.
9. Use the sprinkler for larger areas of grass. Water small patches by hand to avoid waste.

10. Use porous materials for walkways and patios to keep water in your yard and prevent wasteful runoff.
11. Direct downspouts and other runoff towards shrubs and trees, or collect and use for your garden.
12. Install a rain shut-off device on your automatic sprinklers to eliminate unnecessary watering.
13. Choose a water-efficient drip irrigation system for trees, shrubs and flowers. Watering at the roots is very effective, be careful not to over water.
14. Reduce the amount of grass in your yard by planting shrubs and ground cover with rock and granite mulching.
15. Remember to check your sprinkler system valves periodically for leaks and keep the heads in good shape.
16. Don't water your lawn on windy days. After all, sidewalks and driveways don't need water.
17. Water your plants deeply but less frequently to create healthier and stronger landscapes.
18. When watering grass on steep slopes, use a soaker hose to prevent wasteful runoff.
19. Group plants with the same watering needs together to get the most out of your watering time.
20. Remember to weed your lawn and garden regularly. Weeds compete with other plants for nutrients, light, and water.
21. While fertilizers promote plant growth, they also increase water consumption. Apply the minimum amount of fertilizer needed.
22. Avoid installing ornamental water features and fountains that spray water into the air. Trickling or cascading fountains lose less water to evaporation.
23. Buy a rain gauge to track how much rain or irrigation your yard receives. Check with your local water agency to see how much rain is needed to skip an irrigation cycle.
24. Teach your family how to shut off your automatic watering systems. Turn sprinklers off if the system is malfunctioning or when a storm is approaching.
25. Set a kitchen timer when watering your lawn or garden with a hose.
26. Next time you add or replace a flower or shrub, choose a low water use plant for year-round landscape color and save up to 550 gallons each year.
27. Use a screwdriver as a soil probe to test soil moisture. If it goes in easily, don't water. Proper lawn watering can save thousands of gallons of water annually.
28. Avoid over-seeding your lawn with winter grass. Once established, ryegrass needs water every three to five days, whereas dormant Bermuda grass needs water only once a month.
29. Landscape with Xeriscape trees, plants and groundcovers. Call your local conservation office for more information about these water thrifty plants.
30. If you have an evaporative cooler, direct the water drain to a flowerbed, tree, or your lawn.
31. Leave lower branches on trees and shrubs and allow leaf litter to accumulate on top of the soil. This keeps the soil cooler and reduces evaporation.

32. Start a compost pile. Using compost when you plant adds water-holding organic matter to the soil.
33. Use sprinklers that throw big drops of water close to the ground. Smaller drops of water and mist often evaporate before they hit the ground.
34. More plants die from over-watering than from under-watering. Be sure only to water plants when necessary.
35. Water only as rapidly as the soil can absorb the water.
36. Aerate your lawn. Punch holes in your lawn about six inches apart so water will reach the roots rather than run off the surface.

### **COMMUNITY BEHAVIORS**

1. Encourage your school system and local government to help develop and promote a water conservation ethic among children and adults.
2. Make suggestions to your employer to save water (and dollars) at work.
3. Support projects that use reclaimed wastewater for irrigation and other uses.
4. Encourage your friends and neighbors to be part of a water-conscious community.
5. Pick-up the phone and report significant water losses from broken pipes, open hydrants and errant sprinklers to the property owner or your water management district.

### **MISCELLANEOUS BEHAVIORS**

1. Install covers on pools and spas and check for leaks around your pumps.
2. Periodically check your pool for leaks if you have an automatic refilling device.
3. Use a commercial car wash that recycles water.
4. Don't buy recreational water toys that require a constant flow of water.
5. Use a grease pencil to mark the water level of your pool at the skimmer. Check the mark 24 hours later. Your pool should lose no more than  $\frac{1}{4}$  inch each day.
6. When the kids want to cool off, use the sprinkler in an area where your lawn needs it the most.
7. Make sure your swimming pools, fountains, and ponds are equipped with re-circulating pumps.
8. Bathe your pets outdoors in an area in need of water.
9. While staying in a hotel or even at home, consider reusing your towels.
10. When backwashing your pool, consider using the water on your landscaping

**APPENDIX D – CLARK COUNTY UNIFIED DEVELOPMENT CODE TITLE 30.64.070**

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**APPENDIX E – WATER CONSERVATION WEBSITES**

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## **WATER**

- [www.amsa-cleanwater.org](http://www.amsa-cleanwater.org)
- [www.energystar.gov](http://www.energystar.gov)

## **DROUGHT**

- [DroughtMonitor@ndmc.unl.edu](mailto:DroughtMonitor@ndmc.unl.edu)

## **LANDSCAPE**

- [www.usda.gov/news/garden.htm](http://www.usda.gov/news/garden.htm)
- [www.tmwlandscapeguide.com/landscape\\_guide/interactive/index.php](http://www.tmwlandscapeguide.com/landscape_guide/interactive/index.php)

## **EDUCATION**

- [www.wateruseitwisely.com](http://www.wateruseitwisely.com)
- [www.washoeet.dri.edu/](http://www.washoeet.dri.edu/)

## **INSTITUTIONAL**

- [www.douglascountynv.gov/sites/main/index.cfm](http://www.douglascountynv.gov/sites/main/index.cfm)
- [www.lvwd.com](http://www.lvwd.com)
- [www.snwa.com](http://www.snwa.com)
- [www.co.washoe.nv.us/water\\_dept/rwpc/regionalplm](http://www.co.washoe.nv.us/water_dept/rwpc/regionalplm)
- [www.tmh20.com](http://www.tmh20.com)
- [www.cabq.gov](http://www.cabq.gov)
- [www.ci.phoenix.az.us/WATER/wtrteach.html](http://www.ci.phoenix.az.us/WATER/wtrteach.html)
- [www.owue.water.ca.gov/leak/faq/faq.cfm](http://www.owue.water.ca.gov/leak/faq/faq.cfm)

## **LEAK DETECTION**

- [www.who.int/docstore/water\\_sanitation\\_health/leakage/begin.html](http://www.who.int/docstore/water_sanitation_health/leakage/begin.html)

## **APPENDIX F – METER READING INSTRUCTIONS**

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# HOW TO READ YOUR WATER METER

## Locate Your Meter

Most water meters will be located outside in front of your house next to the curb on the street under a steel or concrete lid.

## Reading Your Meter

There are two basic types of meters; a dial with a needle that measures in tenths of a cubic foot and a digital meter that measures from 100,000 down to 1 cubic foot. Most meters also have a small triangle on the face called a flow indicator. It will move when there is water passing through it. Read your meter from left to right.

## Measuring Water Use Activities

It is possible to measure the water use of certain activities. These activities include but are not limited to the following:

- Shower or bath use.
- Watering the lawn.
- Washing clothes or dishes.
- Flushing a toilet
- Washing a car

To measure the water use of an activity, do the following (in order):

1. Make sure all water off. This includes all faucets (inside and out), appliances, swamp coolers, or icemakers.
2. Write down the meter reading to two decimal places.
3. Perform the activity. Be sure to measure the amount of time in minutes that the activity required.
4. At the end of the activity read the meter again. Subtract the first meter reading from the second one. The result is the amount of water used for the activity in cubic feet. To convert to gallons multiply the result by 7.48. To determine how many gallons per minute were used divide the gallon amount by the number of minutes the activity required. You should now have the water used amount in *gallons per minute*.

## Detecting Leaks

1. Make sure all water off. This includes all faucets (inside and out), appliances, swamp coolers, or icemakers.
2. Write down the meter reading and time of day to the minute.
3. Wait at least an hour before reading the meter a second time. Make sure no water is used during the test. Read the meter at the end of the test and record the time to the minute. If the flow indicator is moving during the test you may have a leak.
4. Subtract the first meter reading from the second. Multiply the remainder by 7.48. The result is the amount of water in gallons that passed through the meter during the test period. Also record the time duration of the test.

5. Divide the amount of water by the number of minutes in the test. The result is the amount of water that went through the meter in *gallons per minute*.
6. To measure amount lost over time multiply the gallons per minute by the following:
  - 1,440 for gallons per day.
  - 43,920 for gallons per month.
  - 527,040 for gallons per year.
7. Locating a leak is a process of elimination. Shut off one toilet at a time at the wall. Go to the meter and check to see if the flow indicator (triangle) is still moving. If the triangle has stopped you have discovered the leak. If not go on to the next one and repeat the above steps.
8. Check your sprinkler system. Shut off the system at the anti siphon valve and check the meter.
9. Check your main service line. You will need to shut off the valve between your house and the meter. If the meter stops the leak is between the meter and the valve.
10. These steps can be repeated for every fixture and fitting in your home. In the event you cannot locate the leak, you should call a professional plumber to find and fix it.

## **APPENDIX G – EPA RESIDENTIAL BENCHMARKS**

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<b>Type of Use</b>	<b>Likely Range of Values</b>
<b><i>INDOOR USES</i></b>	
Average household size	2.0 – 3.0 persons
Frequency of toilet flushing	4.0 – 6.0 flushes per person per day
Flushing volumes	1.6 – 8.0 gallons per flush
Fraction of leaking toilets	0 – 30 percent
Showering frequency	0 – 1.0 showers per person per day
Duration of average shower	5 – 15 minutes
Shower flow rates	1.5 – 5.0 gallons per minute
Bathing frequency	0 – 0.2 baths per person per day
Volume of water	30 – 50 gallons per cycle
Washing machine use	0.2 – 0.5 loads per person per day
Volume of water	45 – 50 Gallons per cycle
Dishwasher use	0.1 – 0.3 Loads per person per day
Volume of water	10 – 15 gallons per cycle
Kitchen faucet use	0.5 – 5.0 Minutes per person per day
Faucet flow rates	2.0 – 3.0 gallons per minute
<b><i>OUTDOOR USES</i></b>	
Average lot size	5000 – 8000 square feet
Average house size	1200 – 2500 square feet
Landscape area	4000 – 5000 square feet
Fraction of lot size in turf	30 – 50 percent
Water application rates	1 – 5 feet per year
Homes with pools	10 – 25 percent
Pools evaporation losses	3 – 7 feet per year
Frequency of refilling pool	1 – 2 times per year